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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,495	02/20/2004	Yung-Cheng Chen	N1085-00251 [TSMC2003-083]	2148
54657	7590	12/04/2006	EXAMINER	
DUANE MORRIS LLP IP DEPARTMENT (TSMC) 30 SOUTH 17TH STREET PHILADELPHIA, PA 19103-4196			NORTON, JENNIFER L	
			ART UNIT	PAPER NUMBER
			2121	

DATE MAILED: 12/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Advisory Action</b> <b>Before the Filing of an Appeal Brief</b></p>	<b>Application No.</b> 10/783,495	<b>Applicant(s)</b> CHEN ET AL.	
	<b>Examiner</b> Jennifer L. Norton	<b>Art Unit</b> 2121	

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 14 November 2006 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.  
 b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**NOTICE OF APPEAL**

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3. ☒ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
 (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
 (b) ☐ They raise the issue of new matter (see NOTE below);  
 (c) ☒ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
 (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: See Continuation Sheet. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
 5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
 6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
 7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
 The status of the claim(s) is (or will be) as follows:  
 Claim(s) allowed: \_\_\_\_\_.  
 Claim(s) objected to: \_\_\_\_\_.  
 Claim(s) rejected: 1-22.  
 Claim(s) withdrawn from consideration: \_\_\_\_\_.

**AFFIDAVIT OR OTHER EVIDENCE**

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
 9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
 10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See Continuation Sheet.  
 12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08) Paper No(s) \_\_\_\_\_  
 13. ☐ Other: \_\_\_\_\_

  
**Anthony Knight**  
 Supervisory Patent Examiner  
 Group 3600

Continuation of 3. NOTE: Applicant's arguments, see Remarks pgs. 6-8, filed 14 November 2006 with respect to the rejection of claims 1-4 and 9-11 under 35 U.S.C. 102 (b) have been fully considered but they are not persuasive.

The Examiner respectfully transverse the Applicant's argument U.S. Patent No. 5,409,538 (hereinafter Nakayama) does not disclose, "controlling the exposure energy with a feedback process control signal of critical dimensions, and further controlling the exposure energy with a feed forward process control signal of a compensation amount that compensates for wafer variations.", and "controlling an exposure energy with a feedback process control signal of critical dimension (CD) and controlling the exposure energy with a feed forward process control signal of a compensation amount that compensates for wafer thickness variations such as used to control exposure energy when patterning a substrate."

Nakayama discloses, (col. 6, lines 48-55) "Accordingly, a feedback control of the process conditions of the forming and treating apparatus such as to make constant the film thickness determined in the above-mentioned manner ensures stabilization of the forming and treating apparatus, even if the reflectivity of the wafer before the formation and treatment of the thin film is varied due to variations in the process conditions."

(col. 1, lines 60-67 and col. 2, lines 1-4) "In thin film forming and treating steps such as the film forming step and etching step before or after the exposure step, as shown in FIG. 4, due to the increase in the diameter of the wafer formed and treated and the decrease in the thickness of film, the thickness and optical properties of the thin film formed and treated are varied with slight variations in the production process conditions. In a thin film forming and treating apparatus, therefore, it is necessary to constantly monitor the thickness and optical properties of the thin film being formed or treated, and to control the process conditions so as to keep constant the thickness and optical properties of the thin film."

(col. 15, lines 43-53) "When the exposure, coating and baking conditions are controlled once for a few wafers, an effect on automation of the conventional preliminary operation is obtained. Where process conditions in the same manufacturing apparatus vary on a wafer basis, it is possible to control the exposure, coating and baking conditions on wafer basis. Furthermore, where variations in the process conditions within a wafer are important, it is possible to control the exposure condition on a chip basis and to control the coating and baking conditions within the wafer."

As previously stated in the Final Office Action mailed on 23 August 2006, Nakayama discloses, (col. 15, lines 12-21) "The data sent from the optical property measuring system 108 is used to correct the data sent from the optical property measuring system 56. Based on the results of correction, the process controlling system 45 calculates the optimum exposure energy as a process variable for the exposure step and also calculate variations in process conditions for the photoresist coating step." (col. 15, lines 27-41) "Then, exposure is carried out for the optimum exposure time, whereby stabilization of pattern size is contrived. The variations in process conditions for the photoresist coating step obtained by the process controlling system 45 are fed back through an interface 102 to the photoresist coating machine 49, in order to stabilize the photoresist coating and baking conditions."

In this embodiment, the optical property measuring system 108 and the optical property measuring system 56 can be connected to a plurality of photoresist coating machines to stabilize the photoresist coating and baking conditions constituting the production process conditions, and to a plurality of projection aligners fed with wafers for which the optimum exposure energy has been determined."

Hence, Nakayama discloses the feed forward process control, by using "the results of correction" (i.e. a compensation value determined based on the measured value outputted from the system) to calculate the optimum energy in process controlling system 45 to drive the system to a desired response.

The Applicant has raised the limitations, "used to control exposure energy when patterning a substrate" and "a signal of critical dimension, such as a width or length of a pattern ... is generated based on data collected from a patterned photoresist layer" is not recited in the rejected claims, hence these limitations have not been given any patentable weight. Furthermore, the limitations are recited in the Remarks are not believed to be patentable even if the claims were to be appropriately amended to include the limitation.

The Examiner respectfully transverse the Applicant's argument Nakayama does not disclose, "feedback process control signal of critical dimension".

Nakayama discloses, (col. 6, lines 48-55) "On the other hand, where the thin film to be formed and treated is one which is formed and treated by a film forming apparatus, an etching apparatus or a thin film forming apparatus other than the photoresist coating machine, the complex index of refraction  $N (=n-i \cdot \text{multidot} \cdot \kappa)$  of the thin film is varied during the formation or treatment. Therefore, it is possible to determine the variation with time of the thickness  $d$  of the thin film being formed and treated from equation (1) by preliminarily measuring  $n'$  and  $N$ , measuring the reflectivity  $R'$  of the wafer before the formation and treatment of the thin film, and correcting the measurements of variation of the reflectivity  $R$  with time during the formation and treatment of the thin film. Accordingly, a feedback control of the process conditions of the forming and treating apparatus such as to make constant the film thickness determined in the above-mentioned manner ensures stabilization of the forming and treating apparatus, even if the reflectivity of the wafer before the formation and treatment of the thin film is varied due to variations in the process conditions."

Furthermore, by the Applicant's admission that "critical dimensions", CDs, refers to "dimensions of the smallest geometrical features (width of interconnect line, contracts, trenches, etc) (see Remarks, pg. 7, par. 14-16)" has supported the Examiner's ~~ascertain~~ <sup>assertion</sup> that Nakayama does included measuring and controlling a critical dimension, since a trench is a geometrical feature etched into semiconductor substrate; anisotropic etch in the direction normal to the surface (i.e. depth/thickness) as defined in <http://www.semiconductorglossary.com/default.asp?searchterm=trench>.

In addition, Applicant's arguments, see Remarks pgs. 8-9, filed 14 November 2006 with respect to the rejection of claims 5-8 and 12-22 under 35 U.S.C. 103 (a) have been fully considered but they are not persuasive; and stand rejected as set forth in Final Office action mailed on 23 August 2006. .

Continuation of 11. does NOT place the application in condition for allowance because: The Applicant has not overcome the prior art in the rejections of claims 1-22 as set forth in the Final Office Action mailed on 23 August 2006. Hence, the Applicant's claimed invention is not considered patentably distinct over the prior art.